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Impact Of Erasmus Master Programmes On Regional Innovation And Higher Education: The Case Of The Canary Islands

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Abstract

This article aims to show the impact of Erasmus Masters Programmes on Innovation and Higher Education at a regional level, using the case of the Canary Islands as an example. First, a general characterization and analysis of the situation of Innovation in Canary Islands and, particularly, of Higher Education is provided. Afterwards, a general description of the Erasmus Programme and its main priorities is described. The current impact of Erasmus Master Programmes on regional Innovation and Higher Education in the Canary Islands is assessed based on the definition of the implications of the diverse lines of action of an Erasmus Program on Innovation and Higher Education. The positive aspects of the Erasmus Programs regarding regional Innovation and Higher Education are highlighted, such as the promotion of internationalization and regional cooperation, and also areas that could be improved are indicated. Finally, based on the assessment made, a series of recommendations to improve the impact of Erasmus Programmes in relation to regional Innovation and Higher Education are presented. Among these recommendations we can cite increasing expenditure on R&D and Innovation progressively, especially in business and in science and promoting bilingual programmes at universities in the Region.

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Keywords: Innovation; Higher Education; Erasmus Program; Internationalization

1. Introduction: Brief description of the Canary Islands

The Canary Islands are a Spanish region and, at the same time, an ultra-peripheral region of the European Union, which form an archipelago of seven islands located to the northwest of Africa and 1,350 km south of the Iberian

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Peninsula. The total population of the archipelago in 2012 was 2,125,977 inhabitants (Instituto Nacional de Estastica, INE, 2013), which is known as the *Islas Canarias* or the *Canarias*.

2. Characterization and analysis of the situation of technological innovation and higher education in the Canary Islands

A SWOT analysis has been carried out to evaluate technological innovation and higher education in the Canary Islands. The analysis begins with elements relating to the Canarian context (Opportunities and Threats) and continues with aspects of the Canarian innovation and higher education systems (Strengths and Weaknesses). The Canary Islands are a setting where both opportunities and threats exist. As regards opportunities, those linked to the geographical position of the Islands can be highlighted. This geo-strategic position means the Canary Islands are in a region with internal (port development...) and external (expansion in Africa...) development potential (Mora-Guanche, 2008). Regarding threats, and based on González (1994), Agulló (2000) and Christensen (1997), we emphasize the existence of a regional economic model dependent largely on the support system of the European Union. In order to take advantage of the opportunities from its setting and to deal with the threats, the Canary Islands have some strengths on which they can rely, but also a number of weaknesses or areas for improvement. One of the most relevant strengths of its regional innovation system is, according to the Canary Islands Regional Government (2013), the University of La Laguna, ULL (2013) and the University of Las Palmas de Gran Canaria, ULPGC (2013), the concentration of a significant number of scientific and technological centres in the Canary Islands in different fields. These fields include astrophysics, electronics, information technology, renewable energy, water, geology, biology, agricultural sciences, medicine and aerospace technology, as shown in table 1. Among these centres, we highlight the Canary Islands Technological Institute (ITC) for its regional character, and the Canary Islands Astrophysics Institute (IAC) for the international reach of its research activity. In this regard, it should be stressed that Spain is the 8th in the world for scientific production in astrophysics.

Table 1. Government scientific and technological centres located in the Canary Islands by island (source Gobierno de Canarias (2013) and author's own work)

Island	Scientific-technological Centre
Tenerife	− Canary Islands Technological Institute (ITC) − Canary Islands Astrophysics Institute (IAC) − Institute of Natural Products and Agrobiology (IPNA-CSIC) − Canarian Institute of Agricultural Research (ICIA) − Oceanographic Institute of the Canary Islands − Research Unit of the University Hospital of Canary Islands (HUC) − Research Unit of the Residence La Candelaria − Institute of Technology and Renewable Energies (ITER) − Vegetable Crops in Vitro of Tenerife, SA (CULTESA)
La Palma	− Great Telescope of Canary Islands (GRANTECAN) − Canary Islands Technological Institute (ITC)
Gran Canaria	− National Institute for Aerospace of Maspalomas (INTA) − Geomining Technological Institute of Spain (IGME) − Canarian Institute of Marine Sciences (ICCM) − Canarian Institute for Cancer Research (ICIC) − Research Unit of the Dr. Negrin Gran Canaria Hospital
Lanzarote	− Experimental Agricultural Farm of Arucas − Experimental Agricultural Farm of Lanzarote
Fuerteventura	− Science and Research Institute of Puerto del Rosario (INIPRO)

With regard to higher education, the existence of a wide educational offer by the two Canarian universities, the University of La Laguna (ULL) and the University of Las Palmas de Gran Canaria (UPLPGC) is another strength worth mentioning. In the ULL (2013) (figure 1) and ULPGC (2013), in recent years, there has been a rebalancing of studies between both universities. Although traditionally the University of La Laguna has offered a greater variety of studies in pure and experimental science and humanities compared to the University of Las Palmas de Gran Canaria, where studies on engineering and technology have had a greater presence, today, both universities have a

wide offer that includes studies in pure and experimental science, health sciences, engineering and technology studies, social sciences and humanities.

Fig. 1. University of La Laguna, Tenerife, Spain, Main Building.

As for weaknesses of the Canarian innovation system, according to INE (2012a, 2012b and 2012c), ISTAC (2013), Gobierno de Canarias (1999, 1995, 1991a and 1991b), Morcillo (2006) and Drucker (2002), we can highlight the following aspects:

- Low level of spending on R&D in the Canary Islands relative to the leading Spanish Autonomous Regions in R&D expenditure, which are Madrid and Catalonia, (Madrid and Catalonia represent 47.9 % of total expenditure on R&D in Spain in 2012, which amounted to 6,424.7 million euros). In 2012, the Canary Islands were 13th out of the 17 Spanish Autonomous Regions in relation to expenditure on R & D, and 16th in the percentage of expenditure on R&D to GDP, with a percentage of 0.51 % (in 2012 Spain showed 1.3% expenditure on R&D compared to GDP). Moreover, according to EUROSTAT (2013) in 2010, this indicator was 1.39 % for Spain and 2.00% for the European Union (EU -27). It should be noted that the positioning of the Canary Islands is relatively better in terms of expenditure on R&D by Higher Education institutions (with a percentage of 2.9 % of total R&D expenditure by Higher Education institutions in the whole of Spain, in 2012) and by the Public Administration (with a percentage of 2.4 % of total R&D expenditure by the Public Administration in the whole of Spain). In contrast, R&D expenditure by companies in the Canary Islands in 2012 showed a percentage of 0.6 % of total R&D expenditure by companies in the whole of Spain and a percentage of 20.6% of total expenditure on R&D in the Canary Islands. This moves away from the behavioural pattern of the Autonomous Region leaders on R&D, which have in common that the greatest percentage of expenditure on R & D is carried out by businesses.
- Low level of spending on innovation by the Canary Islands relative to the leading Spanish Autonomous Regions, Madrid and Catalonia, (representing 58.03 % of total expenditure on Innovation of Spain in 2012, which amounted to 13,410.3 million euros).
- Local companies make little investment in technological innovation, which means the Canary Islands are in 14th place among the Spanish Autonomous Regions (accounting for only 0.54% of total spending on innovation in Spain)
- Weak interaction between the various components of the innovation system if the Canary Islands (companies, universities and other scientific and technological centres)
- Absence of a culture of innovation in much of the Canarian society, according to research into innovation culture (Mora-Guanche, 2003)
- Regional economy with a preponderance on the services sector, with tourism being the main driver of the regional economy

- Business network consisting of mainly small companies, which hinder performance of large investments in R&D and technological innovation

3. Lifelong Learning Programme: Overview of the Erasmus Programme and top priorities

Funded by the European Commission, the Lifelong Learning Programme supports a wide range of education and training activities across Europe and provides opportunities for all stages of lifelong learning. Erasmus is the European Commission's leading educational exchange programme for higher education. It was introduced with the aim of increasing student mobility within Europe and now operates across 33 countries and involves over 4,000 higher education institutions. The Erasmus Programme, since its inception, has been promoting the mobility of students and teachers in higher education institutions of the European Union.

Furthermore, the Programme has undergone an evolution since its birth. Thus, the Erasmus Programme designed for period 2014-2020 will include all levels of education: higher education and also the school level, job training and adult education. In addition, its territorial scope will be extended to third party countries, outside the European Union (European Commission, 2013). Erasmus has reached a total of 3 million individuals who have participated in student mobility actions since the programme began.

4. Assessing the impact of the Erasmus Program on innovation and higher education in the Canary Islands

In order to assess the impact of the Erasmus Programme on innovation and higher education at the regional level, the potential impacts of the Erasmus Programme are presented below:

- Increase in the training of students and teachers, through the acquisition of knowledge from programmes in other countries, as well as through improving skills for interaction internationally
- Improving the level of employability of participants in the programme.
- Increasing the potential of research projects as result of cooperation between universities by establishing synergies between various universities to facilitate more ambitious projects than if they were carried out individually.
- Promotion of the internationalization of universities, both through the interrelationship of the training offered to students and teachers as well as in university research
- Promotion of regional cooperation, as a result of the mobility of university staff. In this regard, we emphasize the special importance of the Erasmus Programme for the Canary Islands since it positively influences vital aspects for regional development, such as innovation and internationalization

Following the evaluation of the practical implementation of the Erasmus Programme in the case of exchanges at the University of La Laguna possible benefits have been detected for teachers, such as those listed below (British Council, 2013):

- Partnerships in projects under the TEMPUS, Erasmus students and staff exchange, Erasmus Mundus, LIFE, Leonardo da Vinci, and Copernicus Programmes
- Discovering best practices to bring back to Canary Islands
- Learning and sharing new ideas
- Being inspired by new colleagues and different outlooks
- Discovering new ways of teaching
- Developing new skills
- Developing the international network
- Enhancing language skills
- Improving one’s personal CV

There are also benefits for the institution, such as those listed below (British Council, 2013):

- Staff receive financial assistance for professional development and training through Erasmus Funding
- Staff return motivated and engaged
- Staff can advocate the work of the institution to partner institutions abroad
- Staff can find out about the latest developments across Europe
- It will improve the international standing of the institution

- Staff return enthused with new ideas to improve institution's performance

In 2011 and 2012, Professor Juan C. Santamarta of the University of La Laguna carried out the first programmes in Lifelong Learning. This was a first step in the internationalization of higher education in the Canary Islands and increased ULL visibility and prestige, at European level. Programmes that were performed were (Santamarta, 2013):

- *Master in Environmental Security and Management*: The course is intended to prepare graduates for the employment markets they are likely to face. The course is designed to meet the changing needs of employers as well as the changing nature of the employment market.
- *European Master in Climate Change and Restoration of Degraded Land.* This master is designed as a specialized postgraduate degree, whose objective is to make future graduates capable of dealing with a comprehensive range of climate change management issues.
- *Virtual Training Green Technologies.* The project's aim is to promote and support, at European level, a virtual gateway/platform for skills and knowledge in green technology in partner countries by implementing a strategic approach. It uses a one-stop offer that supports training courses for postgraduate students at the regional and global level that supply valuable skills to the postgraduate market and enables industry to have access to research based solutions. It jointly develops and delivers training programmes in technology enhanced in Green Technology in non-hazardous settings.

5. Recommendations

From the discussion in the previous sections and in order to improve the impact of the Erasmus Programme on innovation and higher education in the Canary Islands, the following recommendations are proposed:

- Increasing expenditure on R&D and Innovation progressively, especially in business and in science.
- Promoting cooperation between the various components of the innovation system: public administration, universities and companies
- Promoting a culture of innovation at the regional level
- Promoting bilingual programmes at Canarian universities, at present, there are no programmes in English at the universities
- Promoting faculty staff who are able to teach in English
- Creating a Canarian International Postgraduate Centre for postgraduate training within the area of influence of the Canary Islands (North and Central Africa) and for European students.

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